Insulin Stacking in Patients Not on the Insulin Pump

Insulin stacking occurs when a bolus of shorter acting insulin (typically insulin aspart or Novolog) is given within 4 hours of an earlier bolus.

Consider that Novolog has an onset within about 15 minutes, peaks at about 1 hour, and lasts for approximately 4 hours. Therefore, if a Novolog correction bolus (the insulin that is given to correct a high sugar) is given within 4 hours of a previous bolus of Novolog, the insulin can "stack" can cause subsequent lows.

Therefore, if you are not on the pump, the general rule is to NOT give a correction bolus more frequently than every 4 hours. If you do give a correction bolus, you must reduce the amount of insulin given in order to take into account possible insulin stacking. For instance, assume your target is 100, your insulin sensitivity factor is 30 and your sugar is 220. You would therefore normally give 4 units to lower it to 100. If you check your sugar 2 hours later and the value is still 220, what should you do? Giving another 4 units would be too much since you still have 2 hours left with the first bolus. Most would just wait 2 hours and recheck. Alternatively, since you are 2 hours or 50% of the way through the active insulin period of 4 hours, simply give 50% of the typical dose or 2 units. If you are 1 hour or 25% of the time into your active insulin period, you would give 25% of the typical dose which in this case would be 1 unit.

The other key to this is that insulin stacking occurs regardless of the type of bolus previously given. In other words if a meal OR correction bolus is given, you have to take into account insulin stacking for the next 4 hours.

If you go on the pump, the "insulin-on-board" computer will make all these calculations for you.

Finally, what about meal boluses that fall within 4 hours of a previous bolus of any kind? Assuming your sugar with the meal or snack is not low, you would always give the full calculated amount of insulin. This is because you are not LOWERING the sugar rather you are preventing the anticipated high that will occur with ingestion of a carbohydrate source. As an example, assume your insulin-carbohydrate ratio is 10. You are eating a light lunch at noon of 30 grams of carbohydrate and therefore give 3 units. At 1 PM, you are going to eat a 20 gm carbohydrate snack. How much Novolog should you give? As long as your sugar is not low, you would give the full 2 units. Please note that even if you gave a correction bolus at noon, you would still give the full meal bolus amount.

If you have any questions, please email your diabetic team. This is a very key issue with bolus therapy and should be understood to optimize control AND prevent significant hypoglycemia.